The Assessment of the Ultimate Hull Girder Strength of RO-RO Ship after Damages

Muhammad Zubair Muis Alie, Department of Naval Architect and Ocean Engineering, Hasanuddin University, Indonesia*
Samuel Izaak Latumahina, Department of Naval Architect and Ocean Engineering, Hasanuddin University, Indonesia
Ganding Sitepu, Department of Naval Architect and Ocean Engineering, Hasanuddin University, Indonesia

* Corresponding author:
Department of Naval Architect and Ocean Engineering
Engineering Faculty, Hasanuddin University.
Jl. Poros Malino km. 6 Bontomarannu postal code: 92172
Gowa, South Sulawesi, Indonesia.
Email zubair.m@eng.unhas.ac.id
Tel: +62-411-586015, FAX: +62-411-586015

ABSTRACT

Many accidents of Ro-Ro ships happen in Indonesia such as collision and grounding. When the collision or grounding takes place on the Ro-Ro ship, the ultimate strength of hull structure after damage becomes decrease. Car and passenger decks are critical location since collision and/or grounding occur. In the present study, the assessment of the ultimate hull girder strength of Ro-Ro ship is conducted. The cross section of Ro-Ro ship is taken to be analyzed. Two cases of damage are considered, namely collision and grounding and those are applied on the Ro-Ro ship's cross section subjected to longitudinal bending in hogging and sagging condition. The collision and grounding damages are assumed to be palced on the side shell and bottom area, respectively. The damages are simply cretaed by removing the element component from the side shell and bottom part. For the simple calculation, the one-frame space of Ro-Ro ship is taken into account. The Smith's method is applied and implemented into the in-house program to calculate the ultimate strength of Ro-Ro ship. The result obtained by in-house program then it is compared with one another, and the progressive collapse behavior is presented and discussed for intact and damage conditions.

KEY WORDS: Ro-Ro; cross section; damages; ultimate strength.